

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition ~~comprising~~consisting essentially of:
 - a) at least one of aluminum sulfate and an aluminum sulfate precursor;
 - b) at least one of boric acid and a boric acid precursor; and
 - c) at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, a precursor of any of these, and mixtures of any of these.
2. (Original) The composition of claim 1, wherein said at least one of a polycarboxylic acid and a polycarboxylic acid precursor comprises at least one of oxalic acid and a water-soluble salt of oxalic acid.
3. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:
 - a) at least one of aluminum sulfate and an aluminum sulfate precursor;
 - b) at least one of boric acid and a boric acid precursor;
 - c) at least one of oxalic acid and a water-soluble salt of oxalic acid; and
 - d) ~~The composition of claim 2 further comprising a second polycarboxylic acid, wherein said second polycarboxylic acid comprises at least one of adipic acid and azelaic acid.~~
4. (Original) The composition of claim 1, wherein said at least one of a polycarboxylic acid and a polycarboxylic acid precursor comprises at least one of citric acid and a water-soluble salt of citric acid.
5. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:
 - a) at least one of aluminum sulfate and an aluminum sulfate precursor;
 - b) at least one of boric acid and a boric acid precursor;
 - c) at least one of citric acid and a water-soluble salt of citric acid; and
 - d) ~~The composition of claim 4 further comprising a second polycarboxylic acid, wherein said second polycarboxylic acid comprises at least one of adipic acid and azelaic acid.~~
6. (Canceled)
7. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:
 - a) at least one of aluminum sulfate and an aluminum sulfate precursor;
 - b) at least one of boric acid and a boric acid precursor;
 - c) at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, a precursor of any of these, and mixtures of any of these; and
 - d) ~~The composition of claim 6, wherein said a polyol comprises comprising at least one of trimethylolpropane, pentaerythritol, and dipentaerythritol.~~

8. (Currently Amended) The composition of claim 6~~7~~, wherein said polyol comprises at least one of trimethylolpropane and pentaerythritol.

9. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:

- a) at least one of aluminum sulfate and an aluminum sulfate precursor;
- b) at least one of boric acid and a boric acid precursor;
- c) at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, a precursor of any of these, and mixtures of any of these; and
- d) ~~The composition of claim 1 further comprising at least one of L-aspartic acid and D-aspartic acid.~~

10. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:

- a) at least one of aluminum sulfate and an aluminum sulfate precursor;
- b) at least one of boric acid and a boric acid precursor;
- c) at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, a precursor of any of these, and mixtures of any of these; and
- d) ~~The composition of claim 1 further comprising glutamic acid.~~

11. (Currently Amended) A composition for treating the surface of a ferrous metal, the composition comprising:

- a) between about 40 wt.% and about 80 wt.% of aluminum sulfate;
- b) between about 10 wt.% and about 20 wt.% total of at least one of boric acid and a boric acid precursor; and
- c) between about 10 wt.% and about 20 wt.% total of at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, a precursor of any of these, and mixtures of any of these.
~~The composition of claim 1, wherein said aluminum sulfate, said at least one of boric acid and a boric acid precursor, and said at least one of a polycarboxylic acid and a polycarboxylic acid precursor are present in the following amounts:~~
 - a) ~~between about 40 wt.% and about 80 wt.% of aluminum sulfate;~~
 - b) ~~between about 10 wt.% and about 20 wt.% total of at least one of boric acid and a boric acid precursor; and~~
 - c) ~~between about 10 wt.% and about 20 wt.% total of at least one of a polycarboxylic acid and a polycarboxylic acid precursor.~~

12. (Currently Amended) The composition of claim 11 wherein said at least one of a polycarboxylic acid and a polycarboxylic acid precursor is selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, azelaic acid, a precursor of any of these, and mixtures of any of these, the composition further comprising:

- d) between about 5 wt.% and about 10 wt.% of citric acid;
- e) between about 2 wt.% and about 5 wt.% of pentaerythritol;
- f) between about 2 wt.% and about 5 wt.% of adipic acid; and
- g) between about 1 wt.% and about 3 wt.% of L-aspartic acid.

13. (Original) A composition for treating the surface of a ferrous metal, the composition comprising:

- a) between about 50 wt.% and about 70 wt.% of aluminum sulfate;
- b) between about 10 wt.% and about 15 wt.% of boric acid;
- c) between about 5 wt.% and about 15 wt.% of oxalic acid;
- d) between about 2 wt.% and about 7 wt.% of citric acid;
- e) between about 2 wt.% and about 7 wt.% of adipic acid;
- f) between about 1 wt.% and about 5 wt.% of pentaerythritol;
- g) between about 1 wt.% and about 5 wt.% of trimethylolpropane;
- h) between about 0.5 wt.% and about 2 wt.% of azelaic acid; and
- i) between about 1 wt.% and about 5 wt.% of L-aspartic acid, D-aspartic acid, or a

mixture thereof.

14. (Currently Amended) A method for treating the surface of a ferrous metal, comprising contacting the surface of a ferrous metal with an aqueous mixture comprising:

- a) aluminum sulfate;
- b) boric acid; and
- c) a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, and mixtures of any of these.

15. (Original) The method of claim 14 further comprising bringing said aqueous mixture to a temperature between about 150°F and about 210°F.

16. (Original) The method of claim 14 wherein the pH of said aqueous mixture is between about 1 and about 4.

17. (Original) The method of claim 14, wherein the contacting step comprises contacting the surface of the ferrous metal with the aqueous mixture for a period of time between about 1 minute and about 15 minutes.

18. (Original) The method of claim 17, wherein said period of time is between about 2 minutes and about 10 minutes.

19. (Original) The method of claim 14, wherein said ferrous metal is a low-carbon steel, and wherein the contacting step comprises contacting the surface of the ferrous metal with the aqueous mixture at a temperature between about 185°F and about 200°F.

20. (Original) The method of claim 14, wherein said ferrous metal is a medium-carbon steel, and wherein the contacting step comprises contacting the surface of the ferrous metal with the aqueous mixture at a temperature between about 170°F and about 200°F.

21. (Currently Amended) The method of claim 14, wherein said ferrous metal is a high-carbon steel, and wherein the contacting step comprises contacting the surface of the ferrous metal with the aqueous mixture at a temperature between about ~~160~~150°F and about 200°F.

22. (Currently Amended) The method of claim 14, wherein said polycarboxylic acid is selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, and mixtures of any of these, the aqueous mixture further ~~comprises comprising~~ at least one of L-aspartic acid and D-aspartic acid.

23. (Original) The method of claim 14, wherein said polycarboxylic acid comprises at least one of oxalic acid and citric acid.
24. (Original) The method of claim 14, wherein said aqueous mixture further comprises a polyol.
25. (Currently Amended) The method of claim 14, wherein said polycarboxylic acid is selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, citric acid, aspartic acid, glutamic acid, and mixtures of any of these, the aqueous mixture further comprises comprising at least one of adipic acid and azelaic acid.
26. (Original) A ferrous metal treated by the method of claim 14.
27. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture ~~comprising~~consisting essentially of water and a composition consisting of:
a) aluminum sulfate;
b) boric acid; and
c) a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, and mixtures of any of these.
28. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:
a) aluminum sulfate;
b) boric acid; and
c) a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, and mixtures of any of these;
~~the~~The aqueous mixture of claim 27 having a pH between about 1 and about 4.
29. (Original) The aqueous mixture of claim 27, wherein said polycarboxylic acid comprises oxalic acid.
30. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:
a) aluminum sulfate;
b) boric acid;
c) oxalic acid; and
d) ~~The aqueous mixture of claim 29 further comprising a second polycarboxylic acid, wherein said second polycarboxylic acid comprises at least one of adipic acid and azelaic acid.~~
31. (Original) The aqueous mixture of claim 27, wherein said polycarboxylic acid comprises citric acid.
32. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:
a) aluminum sulfate;
b) boric acid;
c) citric acid; and

~~d) The aqueous mixture of claim 31 further comprising a second polycarboxylic acid, wherein said second polycarboxylic acid comprises at least one of adipic acid and azelaic acid.~~

33. (Canceled)

34. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:

a) aluminum sulfate;

b) boric acid;

c) citric acid; and

d) The aqueous mixture of claim 33, wherein said polyol comprises at least one of trimethylolpropane, pentaerythritol, and dipentaerythritol.

35. (Currently Amended) The aqueous mixture of claim ~~33~~34, wherein said polyol comprises at least one of trimethylolpropane and pentaerythritol.

36. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:

a) aluminum sulfate;

b) boric acid;

c) a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, and mixtures of any of these; and

d) The aqueous mixture of claim 27 further comprising at least one of L-aspartic acid and D-aspartic acid.

37. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising:

a) aluminum sulfate;

b) boric acid;

c) a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, and mixtures of any of these; and

d) The aqueous mixture of claim 27 further comprising glutamic acid.

38. (Currently Amended) An aqueous mixture for treating the surface of a ferrous metal, the mixture comprising a composition comprising:

a) between about 40 wt.% and about 80 wt.% of aluminum sulfate;

b) between about 10 wt.% and about 20 wt.% of boric acid; and

c) between about 10 wt.% and about 20 wt.% total of a polycarboxylic acid selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, and mixtures of any of these. The aqueous mixture of claim 27, wherein said aluminum sulfate, said boric acid, and said polycarboxylic acid are present in the following relative amounts, exclusive of added water:

a) between about 40 wt.% and about 80 wt.% of aluminum sulfate;

b) between about 10 wt.% and about 20 wt.% of boric acid and a boric acid; and

c) between about 10 wt.% and about 20 wt.% total of a polycarboxylic acid.

39. (Currently Amended) The aqueous mixture of claim 38 wherein the polycarboxylic acid is selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, azelaic acid, and mixtures of any of these, the composition further comprising:

- d) between about 5 wt.% and about 10 wt.% of citric acid;
- e) between about 2 wt.% and about 5 wt.% of pentaerythritol;
- f) between about 2 wt.% and about 5 wt.% of adipic acid; and
- g) between about 1 wt.% and about 3 wt.% of L-aspartic acid.

40. (Original) An aqueous mixture for treating the surface of a ferrous metal, the composition comprising the following materials in the following relative amounts, exclusive of added water:

- a) between about 50 wt.% and about 70 wt.% of aluminum sulfate;
- b) between about 10 wt.% and about 15 wt.% of boric acid;
- c) between about 5 wt.% and about 15 wt.% of oxalic acid;
- d) between about 2 wt.% and about 7 wt.% of citric acid;
- e) between about 2 wt.% and about 7 wt.% of adipic acid;
- f) between about 1 wt.% and about 5 wt.% of pentaerythritol;
- g) between about 1 wt.% and about 5 wt.% of trimethylolpropane;
- h) between about 0.5 wt.% and about 2 wt.% of azelaic acid; and
- i) between about 1 wt.% and about 5 wt.% of L-aspartic acid, D-aspartic acid, or a mixture thereof.

41. (Currently Amended) A method for making an aqueous mixture for treating the surface of a ferrous metal, the method ~~comprising~~ consisting essentially of mixing together in any sequence the following materials:

- a) at least one of aluminum sulfate and an aluminum sulfate precursor;
- b) at least one of boric acid and a boric acid precursor;
- c) at least one of a polycarboxylic acid and a polycarboxylic acid precursor selected from the group consisting of oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, citric acid, aspartic acid, glutamic acid, a precursor of any of these, and mixtures of any of these; and
- d) water.

42. (Original) The method of claim 41 further comprising bringing the pH of the aqueous mixture to between about 1 and about 4.